Astrophysics
Division

Review of Astrophysics Programs for Research, Analysis and Enabling Technology

Website for the Review:

http://science.nasa.gov/astrophysics/working-groups/ApResRev2010/
Search “NASA Astrophysics Research Program Review”

12 January 2011: 217th AAS meeting

Linda Sparke
Research Program Manager
Astrophysics Division

NRC Review of Mission-Enabling Activities in NASA's Space and Earth Science Programs

- An **NRC Review** published Dec 2009 **led by Lennard Fisk (U. Michigan)** examined the **Role and Scope** of these **Mission-Enabling Activities**:
  - research projects such as suborbital rocket or balloon flights; dedicated laboratories and computer systems; data archives
  - developing advanced sensors, instruments and systems for missions
  - analysis and applications of science data returned from NASA missions
- These activities should provide a
  - knowledge base to explore new frontiers and address NASA's strategic goals
  - wide range of technologies for future missions
  - robust, experienced technical workforce to plan and conduct science missions
- The committee recommends that NASA should ensure that mission-enabling activities are clearly linked to strategic goals, using metrics to actively manage its portfolio to fulfill the above requirements, with special attention to
  - innovative high-risk/high-payoff research and technology, and
  - development of the scientific and technical workforce
- Final Report at http://www.nap.edu/catalog.php?record_id=12822

Astro2010 Decadal Survey

In Research, Analysis and Enabling Technology, Astro2010 recommended:

• 25% more suborbital flights: fast turn-round to enable science, develop technology and train future workforce (payload funding now ~$25M/year)

• an Intermediate Technology program to fill the gap between 'blue skies' and mission development: $15M/year by 2021

• 25% increase in Laboratory Astrophysics to interpret data from spectroscopic missions (now $3M/year)

• 25% increase in Astrophysics Theory (now $12M/year)

• Theory and Computation Networks: joint NASA/NSF/DoE, $5M/year at NASA. These would tackle large simulation and computational problems.

Review of Astrophysics programs for Research, Analysis and Enabling Technology

In response to the Fisk Report and the 2010 Decadal Survey, the Astrophysics Division has convened this review:

A panel with 14 members represents a wide community:
investigators at universities, NASA centers, and elsewhere;
small institutions as well as large ones; geographic diversity;
early-career and established investigators; demographic diversity;
investigators on 'soft money' and those with base funding (e.g. academic-year salary)

Public comment session 12 January 2011 at Seattle AAS meeting

Interim report to Astrophysics Subcommittee 16-17 February 2011

Report due to NASA by 15 May 2011, ahead of Boston AAS meeting

Research Program Review Panel

Jay	Gallagher	U Wisconsin	Chair; spectroscopy, galaxies, journal editor
Sterl	Phinney	Caltech	Co-Chair; theory, fundamental physics
John	Blondin	N Carolina State U	theory, supernova remnants, X-rays
Steve	Boggs	UC Berkeley	Balloon PI, gamma rays
Dennis	Ebbets	Ball Aerospace, Colorado	UV spectroscopy, exoplanets
Miriam	Forman	SUNY Stony Brook	particle acceleration: cosmic rays, solar wind
Tom	Greene	NASA Ames	exoplanets
Mary Beth	Kaiser	Johns Hopkins	Rocket PI, UV to near-IR astronomy
Tom	Loredo	Cornell	astrostatistics; Large Scale Synoptic Telescope
Amber	Miller	Columbia	CMB science, microwave instrumentation
James	Neff	College of Charleston	X-ray, UV, stellar coronae
Joseph	Nuth	NASA Goddard	dust, molecules (planetary)
Howard	Smith	Center for Astrophysics	infrared spectroscopy
Chris	Walker	U Arizona	THz spectroscopy, interstellar gas, balloon PI

Research, Analysis and Enabling Technology: Review Charge

The object of this comparative review is to assist NASA to increase the effectiveness of its Research, Analysis and Enabling Technology programs.

The purpose of these programs is to maximize the scientific productivity from NASA's current and future missions, in the context of the science goals, objectives and research focus areas described in the Science Mission Directorate's Science and Strategic Plans, and the Astro2010 Decadal Survey.

The review will use readily available data to assess the effectiveness of the programs.

Review charge is at
http://science.nasa.gov/astrophysics/working-groups/ApResRev2010/

Research, Analysis and Enabling Technology: Specific Questions for the Review – 1

The Astrophysics Research and Analysis (APRA) program funds enabling technology, suborbital payloads and lab astrophysics: does the program
-- balance appropriately between suborbital flight opportunities and the development of enabling technology and of detectors?
-- make initial investments in technology that are appropriate to NASA's future strategic missions?
-- allow PIs to develop technology to readiness required for an Explorer proposal?
-- fund laboratory astrophysics in a way that optimizes interpretation of data from current and future space missions?
How should APRA complement activities in the Office of the Chief Technologist? (see http://www.nasa.gov/offices/oct/home/roadmaps/index.html)

Is the Astrophysics Theory Program appropriately targeted to facilitate interpretation of results from current missions, and aid in developing concepts for future missions?
-- What are appropriate metrics to judge whether too large a fraction of the Astrophysics budget is spent on theory, or too little?
-- Is the range of award sizes suited to the theory challenges addressed?

Research, Analysis and Enabling Technology: Specific Questions for the Review – 2

The Origins of Solar Systems (OSS) program is run jointly with the Planetary Science Division; the Astrophysics element supports exoplanet detection, from space and from the ground. The Astro2010 Decadal Survey emphasizes NSF's role in enabling ground-based observations.

-- How should the OSS program change to complement NSF's role?

-- Should the OSS program be continued to foster interdisciplinary collaboration with Planetary Science?

The Astrophysics Division funds analysis of mission data in two ways.

The Astrophysics Data Analysis Program (ADAP) funds analysis and interpretation of data in the public archives of NASA missions, and international space missions such as CoRoT and Herschel. These are multi-year awards for investigations using data from multiple missions.

Guest Observer and Investigator awards are associated with specific operating missions; they fund analysis and interpretation of data from particular proposed observations. These are typically single-year awards, with funding released only when the observations are taken.

-- What are the strengths and weaknesses of these two funding models, and how should NASA appropriately balance between them?

Guest Observer/Investigator Programs

NASA reviews each Guest Observer or Guest Investigator program along with mission operations:

Funding levels for all currently-operating Astrophysics missions and their GO/GI programs will be set by the 2012 Senior Review.

This review will

-- compile best practices in the Astrophysics Data Analysis Program and across the mission GO/GI programs: reviewing proposals, award sizes and durations, etc.

-- consider what metrics could best be used to assess program effectiveness in promoting: scientific productivity from current missions; technology development for the future; developing new PIs; appropriate training for a future workforce; public engagement; etc.

-- highlight areas of potential concern in implementing these metrics

Research, Analysis and Enabling Technology: Specific Questions for the Review – 3

The NRC/Fisk Report notes (Box S.1) that Research and Analysis programs should enable a "healthy scientific and technical workforce" for NASA's science missions.
-- Should this be a consideration in evaluating and selecting proposals?
-- What metrics might be appropriate for the program's effectiveness in this area?

The Fisk Report points out the importance of funding high-risk proposals that offer high potential returns. What metrics might be appropriate for the program's effectiveness in this area?

The review should also identify any:
-- options to add new proposal opportunities, or remove existing opportunities.
-- areas of Research, Analysis and Enabling Technology where NASA could fruitfully partner with NSF, DoE or other agencies.
-- ways in which we could improve the mechanics of our reviews.

Finally: this review should make recommendations on appropriate review metrics, and on a mechanism for future review of the Astrophysics Research, Analysis and Enabling Technology programs.
What data could most usefully be collected to assist future assessments?

Website for community comments

The Astrophysics Division welcomes comments for this review of our programs for Research, Analysis and Enabling Technology.

From 18 January 2011, a public-comment website will be open at http://astroresearchreview.nsstc.nasa.gov/portal/

We ask those who want to comment to register in NSPIRES, so that you are on the mailing list for Research Program solicitations. But your comments will be anonymous to the review panel unless you specify otherwise.

On the website, you will be able to
– leave comments only, or
– leave comments with some demographic information, and
– leave your e-mail address along with your comments